FAST FACTS
HYDROCHLORIC ACID

Missouri Department of Health
Hazardous Substance Emergency Events Surveillance (HSEES) Program

Synonyms: Hydrogen chloride
Muriatic acid

CAS Number: 7647-01-0

DOT Numbers: UN1050 (anhydrous)
UN1789 (solution)

DOT Designation: Corrosive material

Hazard Rating	NFPA
HEALTH	3
FLAMMABILITY	0
REACTIVITY	0
• Corrosive and reactive • Containers may explode in fire • Poisonous gasses are produced in fires	

Hazard Rating Key:
0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

Exposure Levels

- Short-term exposure through inhalation may cause inflammation and destruction of the nasal passages, dental erosion, loss of voice, coughing, pneumonia, headaches and rapid throbbing of the heart. May cause death in the range of 1,000-2,000 parts per million (ppm).
- Small quantities of hydrochloric acid may cause irritation or burns of the skin.
- If ingested, hydrochloric acid may cause irritation of the mouth, throat and stomach; salivation, nausea, vomiting, chills and fever; holes in the intestinal tract; inflammation of the kidneys; and shock.

Characteristics and Potential Exposures

Hydrochloric acid, or hydrogen chloride, is either a colorless liquid with a pungent odor, or a colorless to slightly yellow gas that can be shipped as a liquefied compressed gas. The acid is used in the production of fertilizers, dyes, dyestuffs, artificial silk, and paint pigments, and in refining edible oils and fats. Hydrochloric acid is also used in electroplating, leather tanning, ore refining, soap refining, petroleum extraction and pickling of metals, and is used in the photographic, textile and rubber industries. In addition, hydrochloric acid is used as an antiseptic in toilet bowls against animal pathogenic bacteria, and in food processing as a starch modifier.

Hydrochloric Acid Releases in Missouri

During calendar years 1994-1998, 1,071 HSEES events were reported in Missouri. Of those, 39 events involved hydrochloric acid. Quantities released ranged from 1 ounce to 7,000 gallons, and from 10 to 2,370 pounds. Fixed facilities were involved in 22 of these events, while 17 occurred during transport. No one sustained injuries in these events; however, five evacuations were reported as a result of hydrochloric acid spills. One event (see below) resulted in the evacuation of approximately 800 people.

Interesting Event

A teacher knocked over a liter of hydrochloric acid in a high school science lab, shattering the bottle and spilling the contents. The classroom was immediately evacuated, and then the entire school. Approximately 800 students and teachers were evacuated from the building and dismissed from school as firefighters ventilated the building and cleaned up the spill. The teacher and the 24 students in the science lab were taken to a hospital as a precaution, but no one suffered any injuries.

Health Hazard Information

- Hydrochloric acid can irritate and burn the skin and eyes. Exposure to the eyes may cause severe damage to the surface of the eye.
- Exposure to hydrochloric acid or hydrogen chloride can irritate the mouth, nose and throat.
- Breathing hydrogen chloride can irritate the lungs, causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), with severe shortness of breath.

Personal Protective Equipment Guidelines

- Appropriate protective clothing should be worn to prevent any possible skin contact with liquids of pH <3, or repeated or prolonged contact with liquids of pH >3.

- Wear eye protection to avoid any possibility of eye contact, unless full facepiece respiratory protection is worn.
- Whenever the potential exists for exposures over 5 ppm, use a National Institute for Occupational Safety and Health (NIOSH) approved full facepiece respirator with an acid gas canister specifically approved for hydrogen chloride. Increased protection is obtained from full facepiece powered-air purifying respirators.

Handling and Storage

- Avoid contact with zinc, brass, galvanized iron, aluminum, copper and copper alloys since violent reactions occur.
- Hydrochloric acid is not compatible with strong bases (such as sodium hydroxide and potassium hydroxide) and organic materials (such as wood).
- Store cylinders at temperatures under 125° F (52° C).
- Store in tightly closed containers in a cool, well-ventilated area away from water and oxidizing agents (such as perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine and fluorine).
- Hydrochloric acid ignites on contact with fluorine and metal carbides.

Spills and Emergencies

- Most environmental emergencies involve spills of hazardous materials that must be reported to the Department of Natural Resources through a 24-hour hotline (573-634-2436). When reporting a spill, callers can also obtain technical assistance regarding response, containment and cleanup of hazardous materials.
- Restrict persons not wearing protective equipment from areas of spills or leaks until cleanup is complete.
- If hydrogen chloride gas is leaked, ventilate the area of leak to disperse the gas and stop the flow of gas. If the source of the leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair the leak or allow the cylinder to empty.
- Absorb liquid spills in vermiculite, dry sand, earth, or a similar material. Shovel the material and deposit in sealed containers.
- Ventilate and wash the area after clean up is complete.

Disposal Methods

Soda ash-slaked lime is added to form a neutral solution of chloride of sodium and calcium, which can be discharged after dilution with water.

Fire Extinguishing

Extinguish the fire using an agent suitable for the type of surrounding fire. (The material itself does not burn.)

Emergency First Aid Measures

Eye Contact

- Immediately flush with large amounts of water. Continue for at least 30 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

- Quickly remove contaminated clothing. Immediately wash skin with large amounts of water. Seek medical attention immediately.

Respiratory

- Remove the victim from the site of the release.
- Begin rescue breathing if breathing has stopped, and CPR if heart activity has stopped.
- Transfer the victim promptly to a medical facility. Medical observation is recommended for 24 to 48 hours after overexposure, as fluid in the lungs may be delayed.

Ingestion

- Seek medical attention immediately. Give large quantities of water and do not induce vomiting.

For more information on the Missouri HSEES program, please contact the HSEES Coordinator at 573-751-9071.

Information for this fact sheet was obtained from the Missouri HSEES Program Five-Year Data Analysis; the Environmental Protection Agency (EPA); the Agency for Toxic Substances and Disease Registry (ATSDR); and the Handbook of Toxic and Hazardous Chemicals and Carcinogens, Third Edition.

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